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(54) Title: METHOD AND APPARATUS FOR DIGITAL SIGNAL PROCESSING ENHANCED LASER PERFORMANCE COMPENSATION
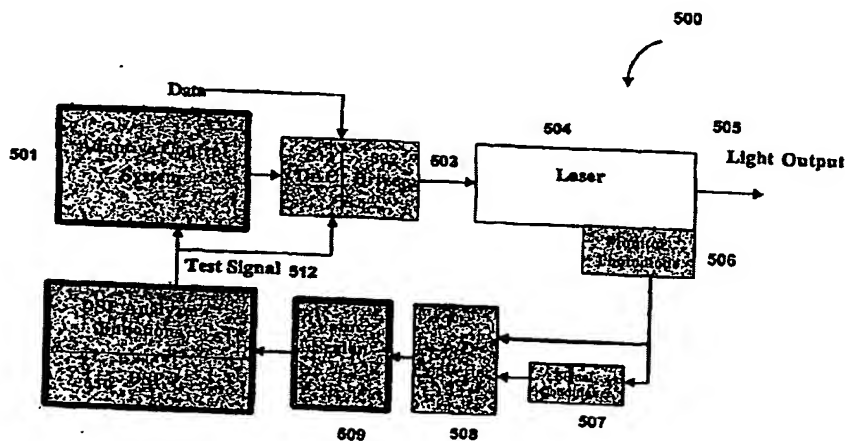
(57) Abstract: Methods for controlling lasers or other light emitting devices to compensate for performance degradations due to temperature changes and aging without disrupting the transmission of information are presented. Disclosed embodiments describe various methods of applying mathematical models and digital signal processing algorithms to continuously calculate and execute precise output power adjustments. A synthesized test signal is injected into the normal data stream is applied to the laser system. The magnitude of the test signal is sufficiently small that it is buried in system noise and will not alter the noise margin of the signal or the transmitted data. Micro-detection, recovery and digital signal processing of the embedded test signal produces precisely monitored output power and modulation amplitude measurements used to accurately adjust performance characteristics regardless of temperature or age.